

What is claimed is:

1. A gas separation apparatus for separating at least one specific gas from a gas to be treated which contains a plurality of specific gases, said apparatus comprising:

a first separator for separating said gas to be treated into gas groups having different boiling points by distillation separation; and

10 a second separator for separating specific gases by performing chromatographic separation on at least one gas group separated by said first separator.

2. A gas separation apparatus according to claim 1, wherein said second separator chromatographically separates a plurality of specific gases having similar boiling points.

3. A gas separation apparatus according to claim 1, wherein said gas to be treated contains PFC gases discharged from a semiconductor manufacturing process as the specific gases and nitrogen as another 20 gas.

4. A gas separation apparatus according to claim 3, wherein said PFC gases contain fluorine compounds having at least one element of C, N, and S as the constituting element.

5. A gas separation apparatus according to claim 3, wherein said PFC gases include at least  $\text{CF}_4$  and  $\text{NF}_3$ .
6. A gas separation apparatus according to claim 5, wherein said  $\text{CF}_4$  and  $\text{NF}_3$  are separated into the same gas group at said first separator and are separated from each other at said second separator.
7. A gas separation apparatus according to claim 4, wherein said PFC gases include at least  $\text{C}_2\text{F}_6$  and  $\text{CHF}_3$ .
8. A gas separation apparatus according to claim 7, wherein said  $\text{C}_2\text{F}_6$  and  $\text{CHF}_3$  are separated into the same gas group at said first separator and are separated from each other at said second separator.
9. A gas separation apparatus according to claim 1, wherein said second separator comprises a plurality of chromatographic columns; the column into which feed gas flows is sequentially switched among the plurality of chromatographic columns; and the function of each column is sequentially changed.
10. A gas separation method for separating at least one specific gas from a gas to be treated containing a plurality of specific

gases, said method comprising the steps of:

a first separation step for separating said gas to be treated into gas groups having different boiling points by distillation separation; and

5        a second separation step for separating the specific gases by performing chromatographic separation on at least one gas groups that is distillation separated at said first separation step.

11. A gas separation method according to claim 10, wherein in said  
10 second separation step, a plurality of specific gases having similar  
boiling points are chromatographically separated.

12. A gas separation method according to claim 10, wherein said  
gas to be treated contains PFC gases discharged from a semiconductor  
15 manufacturing process as the specific gases and nitrogen as another  
gas.

13. A gas separation method according to claim 12, wherein said  
PFC gases include fluorine compounds having at least one element  
20 of C, N, and S as the constituting element.

14. A gas separation method according to claim 13, wherein said  
PFC gases include at least  $\text{CF}_4$  and  $\text{NF}_3$ .

25 15. A gas separation method according to claim 14, wherein said

~~CF<sub>4</sub> and NF<sub>3</sub> are separated into the same gas group at said first separation step and are separated from each other at said second separation step.~~

5 16. A gas separation method according to claim 13, wherein said PFC gases include at least C<sub>2</sub>F<sub>6</sub> and CHF<sub>3</sub>.

17. A gas separation method according to claim 16, wherein said C<sub>2</sub>F<sub>6</sub> and CHF<sub>3</sub> are separated into the same gas group at said first separation step and are separated from each other at said second separation step.